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Aphasia Assessment on Android: Recording Voice, Eye-Gaze and Touch for the BAT

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Background

Linguistic proficiency may be difficult to assess uniformly, especially in a population suffering from aphasia. Achim and Marquis (in press) automated part of the Bilingual Aphasia Test (Paradis, Libben & Hummel, 1987) in order to render uniform its administration. The present paper follows up on this by bringing the full BAT to a "virtual paper" touch environment which is potentially just as natural and intuitive for patients to use, and for clinicians to administer as the paper BAT.

Methods

In this paper, we present results to validate the Android BAT against the paper BAT using a counterbalanced test-retest design on normal and patient populations. We also discuss patterns in the data recorded and feedback received from clinicians and test-participants. The Android touch tablet application for the BAT was designed to simulate the flexibility of the paper BAT, with the added benefit of allowing for a diversity of data collection. Using existing open-source libraries (Walker, Lamere, Kwok, Raj, Singh, Gouvea, Wolf & Woelfel, 2004; Babcock & Pelz, 2004) the Android BAT app records and analyzes the patient's voice, eye gaze and image touch location not only to get a better picture of the patient's profile, but also to reduce data entry which must be done post assessment, and to permit review of the information later during treatment.

Discussion

The Android BAT application is available for English (Hummel & Libben, 1989) and French (Goldblum & Paradis, 1989) versions of the BAT. Based on feedback, we made a user-friendly interface (OPrime) so that other assessments and other assessment designs can also be created. While we originally planned the application for the iPad 2, after some consideration we ultimately chose the Android OS for "plug-and-play" integration with clinics' existing database systems via the Android "intents" architecture (Aanesen, Huntley, Feil, al-Own & Spratt, 2009; Doukas, Pliakas & Maglogiannis, 2010) and the future possibility to use intents to integrate commonly used open-source software written in Java or C++ (Xu, Jiang & Lau, 2008; Chau & Betke, 2005; Boersma & Weenink, 2009; MacWhinney, 2009; Cunningham, Maynard, Bontcheva & Tablan, 2002) with the assessment application. The application is free and open-source which means that researchers and clinicians can adapt the application for their language and assessment needs, as well as customize its input and output to integrate with their existing data entry systems and in-house assessments.

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